WASHINGTON'S CITY ARTERIALS
CONDITION REPORT 2004

By Bob Brooks – Highways & Local Programs

BACKGROUND:

As companion legislation to the increased transportation funding package (nickel gas tax) the legislature passed in April 2003 the transportation efficiencies bill. This bill established planning and efficiency goals for the state and local transportation network. Among other provisions of the bill is a requirement for cities to report pavement condition data for their arterial streets beginning with the 2003-2005 biennium.

RCW 46.68.113: *During the 2003-2005 biennium, cities and towns shall provide to the transportation commission, or its successor entity, preservation rating information on at least seventy percent of the total city and town arterial network. Thereafter, the preservation rating information requirement shall increase in five percent increments in subsequent biennia. The rating system used by cities and towns must be based upon the Washington state pavement rating method or an equivalent standard approved by the transportation commission or its successor entity.*

To meet this biennium's reporting requirement Highways & Local Programs (H&LP) working in concert with the Association of Washington Cities (AWC) and several city pavement managers developed a reporting protocol that offered the least impact to the cities in meeting the reporting requirement. Once finalized, a letter outlining the reporting protocol was sent to each of the state's cities and towns. Estimates of each cities arterial mileage was obtained from the DOT's Transportation Data Office and the top 30 cities with the most arterial mileage were requested to furnish arterial condition ratings this biennium.

In response to this request, 27 cities submitted arterial condition data totaling 1,598.61 centerline miles. Several cities also voluntarily furnished condition data on their collector and local access networks totaling 726.42 centerline miles and 1,970.45 centerline miles respectively. Having this data available supplies important documentation on the condition of the state's city street network and makes the job of educating decision makers much easier and more effective. This data will be reported to the Transportation Commission as required by law and through the AWC presented to the Legislature and other interested parties.

DISCUSSION:

The following table summaries the data for rated streets reported by the cities:

Functional Class	Centerline Miles	Lane Miles	Ave. Rating Score	Square Yards
Principal Arterials	717.62	2,619.80	73	20,537,797
Minor Arterials	880.99	2,336.36	72	20,510,094

Collectors	726.42	1,567.16	69	14,243,574
Local Access	1,970.45	3,940.79	74	34,827,597
Totals	**4,295.48**	**10,464.11**	**73**	**90,119,062**

THE ARTERIAL NETWORK:

City Data: The combined principal and minor arterial network information for each city is shown in the table below.

City	Centerline Miles	Lane Miles	Ave. Rating Score	Square Yards
Auburn	49.81	150.04	72	1,227,233
Bellevue	70.52	243.29	86	1,589,700
Bellingham	72.32	184.60	74	1,686,266
Ellensburg	18.34	40.56	58	429,922
Everett	62.55	230.73	84	1,966,281
Federal Way	31.67	108.58	83	875,413
Friday Harbor	5.39	10.78	67	113,679
Kennewick	50.32	148.26	90	1,490,098
Kent	25.53	100.82	83	747,125
Kirkland	29.97	77.02	64	719,145
Lacey	42.97	133.29	67	878,494
Mount Vernon	19.40	47.81	89	448,026
Olympia	66.54	210.50	68	1,501,245
Pasco	38.95	118.25	78	861,997
Puyallup	27.05	87.08	78	715,048
Redmond	31.86	102.17	91	891,144
Renton	41.88	150.47	77	1,159,614
Sammamish	18.43	38.85	82	423,068
SeaTac	18.30	48.15	83	429,362
Seattle	341.13	992.63	69	8,340,876
Spokane	105.33	386.82	75	3,007,675
Spokane Valley	91.99	296.38	87	2,424,670
Tacoma	133.56	465.03	56	3,710,546
Tumwater	16.76	33.52	80	402,596
Vancouver	81.15	239.55	70	2,346,814
Walla Walla	46.37	105.45	77	1,071,245
Yakima	60.53	205.56	77	1,590,611
Totals	**1,598.61**	**4,956.16**	**73**	**41,047,891**

Arterial data reported by each city

The data above represents 98.2% of the arterial information reported by the 27 cities. The range of average rating scores within the various cities was fairly large and ranged from a low of 56 in Tacoma to a high of 91 in Redmond with the overall average at the mid-point of the range at 73. Given the volume of traffic and loading that these arterial routes carry and considering that the pavement area is the equivalent of approximately 8,481 acres, maintaining just this reported portion of the arterial network alone represents a tremendous effort on the part of the reporting cities.

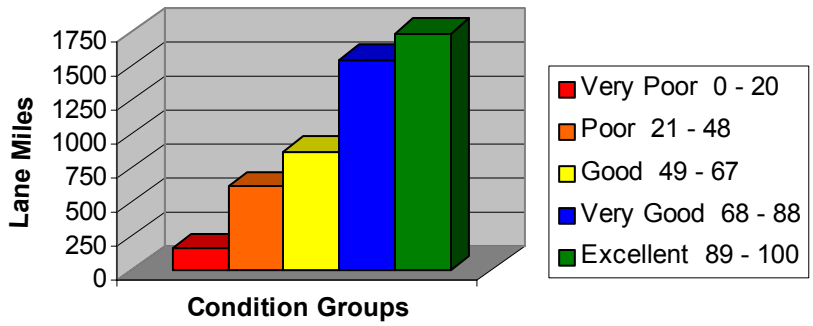
Additional arterial information was reported by 7 of the 27 cities but contained no rating information and therefore was not tabulated in the table above. That unrated information is summarized in the table below.

Arterials	Centerline Miles	Lane Miles	Square Yards
Non-rated Arterials	31.68	89.61	706,870

Condition Groups: The following pavement rating condition groups show the distribution of the arterial lane mileage within the various condition groupings. The distribution shows that 15.8% of the arterial lane mileage falls within the very poor to poor category and that 66.5% of the lane mileage falls within the very good to excellent categories. The remaining 17.7% falls into the central good category. Since this was the first arterial reporting effort we will have to wait until future biennium's to determine if the arterial network is gaining or losing ground overall. This will be one of the more interesting trends to follow as we move forward with the reporting effort.

Condition Group	Centerline Miles	Lane Miles	Ave. Rating Score	Percentage
Very Poor 0-20	53.33	161.40	11	3.3%
Poor 21-48	207.24	619.88	37	12.5%
Good 49-67	284.91	874.87	59	17.7%
Very Good 68-88	499.69	1,552.23	79	31.3%
Excellent 89-100	552.02	1,743.93	97	35.2%

Distribution of arterials within the pavement condition rating groups

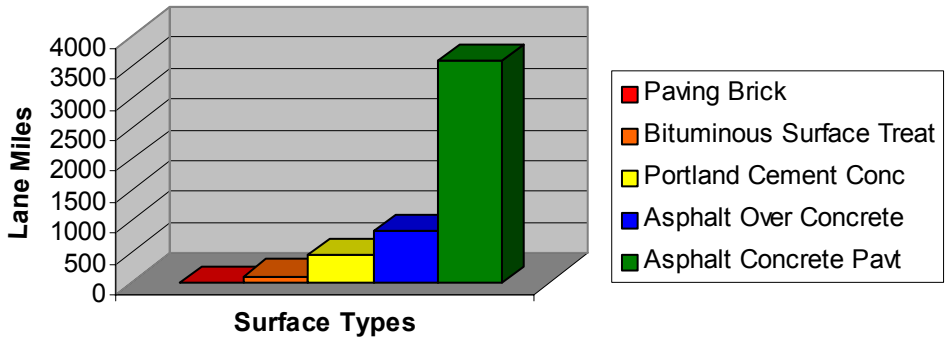


Arterial lane mileage within condition groups

Surface Types: The following table and chart show the distribution of the pavement surface types within the arterial network. As would be expected, the majority of the lane mileage is comprised of asphalt concrete pavement at 72.4%. Asphalt over portland cement concrete makes up the second largest surface type at just under 17%. This is followed by portland cement concrete at 8.8% and bituminous surface treatment at 2.1%. The City of Tacoma has 0.23 arterial lane miles of ornamental paving brick in new condition. Bituminous surface treatment and asphalt over portland cement concrete are the two surface types with the lowest average rating scores of 61 and 63 respectively.

Pavement Type	Centerline Miles	Lane Miles	Ave. Rating Score	Percentage
Paving Brick	0.08	0.23	100	0.0%
Bituminous Surface Treat	44.76	106.15	61	2.1%
Portland Cement Conc	162.74	437.53	77	8.8%
Asphalt Over Concrete	250.91	826.43	63	16.7%
Asphalt Concrete Pavt	1,140.13	3,585.83	74	72.4%

Arterial surface types



Arterial lane mileage by surface type

Truck & Transit Routes: The following table summarizes the truck and transit route information supplied by the cities. Three cities identified truck and/or transit routes within their arterial networks. The small amount of truck and transit mileage reported (9% of total lane mileage) does not provide enough information to make a meaningful comparison with the overall arterial network.

Route Type	Centerline Miles	Lane Miles	Ave. Rating Score	Square Yards
Truck Route Arterials	31.18	90.63	78	736,305
Transit Route Arterials	115.23	364.41	77	3,001,130
Totals	**146.41**	**455.04**	**77**	**3,737,435**

Arterial truck and transit routes

THE COLLECTOR NETWORK:

City Data: Of the 27 cities reporting arterial data; 22 supplied all or part of their collector information as well. The following table summaries the collector data reported by each city.

City	Centerline Miles	Lane Miles	Ave. Rating Score	Square Yards
Auburn	21.99	45.15	69	412,513
Bellevue	50.93	106.56	85	790,059
Bellingham	22.46	43.06	72	363,113
Everett	34.68	84.99	85	812,277
Federal Way	11.94	26.40	85	227,359

Kirkland	24.79	50.77	72	425,632
Lacey	7.90	16.44	67	106,071
Mount Vernon	12.50	26.80	89	247,489
Olympia	18.51	37.64	67	315,280
Puyallup	21.43	46.86	76	414,547
Redmond	18.21	41.62	89	396,043
Renton	22.92	53.27	70	448,570
Sammamish	11.26	22.58	69	205,052
SeaTac	10.48	23.30	84	196,932
Seattle	136.14	268.77	68	2,436,342
Spokane	80.87	193.56	58	1,833,313
Spokane Valley	36.68	75.34	85	660,217
Tacoma	71.97	174.81	51	1,634,856
Tumwater	16.79	33.59	83	343,042
Vancouver	58.84	121.01	69	1,333,446
Walla Walla	16.09	32.18	65	326,486
Yakima	19.05	42.46	73	314,936
Totals	**726.42**	**1,567.16**	**69**	**14,243,574**

Collector data reported by each city

The data above represents 98.8% of the collector information reported by the 22 cities. The range of average rating scores within the various cities was again fairly large and ranged from a low of 51 in Tacoma to a high of 89 in Redmond and Mount Vernon with the overall average at the mid-point of the range at 69. With very few exceptions, the cities average rating scores for collectors are very consistent with the cities average scores for arterials. Spokane has the largest difference with an average score of 75 for their arterials and a 58 for the collector network. The correlation coefficient between the cities arterial and collector average rating scores is 0.84.

Additional collector information was reported by 5 of the 22 cities but contained no rating information and therefore was not tabulated in the table above. That unrated information is summarized in the table below.

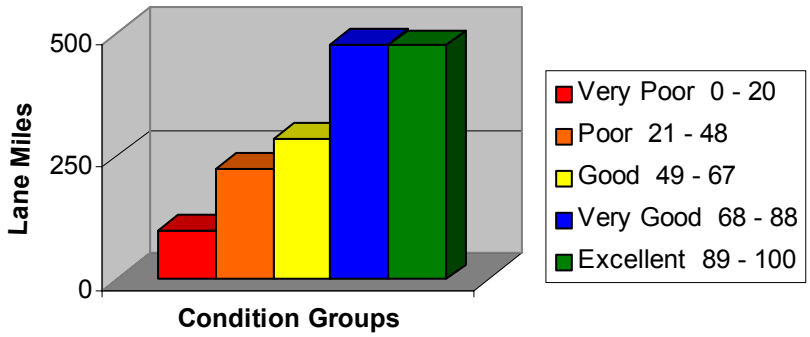
Collectors	Centerline Miles	Lane Miles	Square Yards
Non-rated Collectors	9.54	18.72	131,091

Condition Groups: The following pavement rating condition groups show the distribution of the collector lane mileage within the various condition groupings. The distribution shows that 20.8% of the collector lane mileage falls within the very poor to poor category and that 60.8% of the lane mileage falls within the very good to excellent categories. The remaining 18.3% falls into the central good category. The collector distribution within condition groups shows good correlation with the distribution shown by the arterial network. The correlation coefficient between arterial and collector condition group distribution percentages is 0.99.

Condition Group	Centerline Miles	Lane Miles	Ave. Rating Score	Percentage
Very Poor 0-20	46.15	99.72	7	6.4%

Poor 21-48	103.22	226.14	36	14.4%
Good 49-67	132.51	286.93	58	18.3%
Very Good 68-88	222.78	478.23	79	30.5%
Excellent 89-100	221.07	474.75	97	30.3%

Distribution of collectors within the pavement condition rating groups

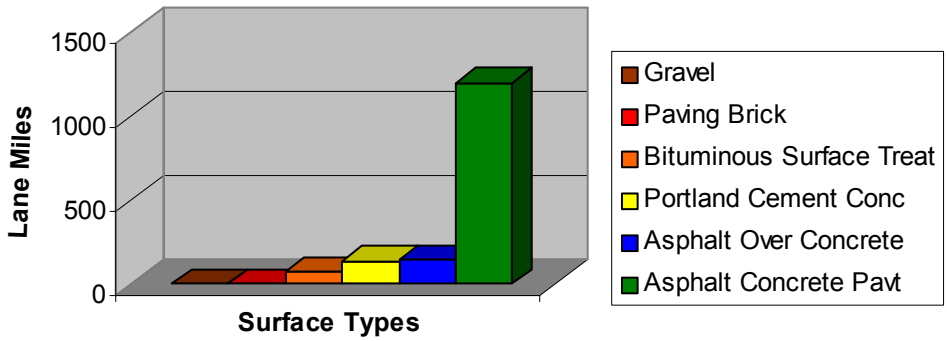


Collector lane mileage within the condition groups

Surface Types: The following table and chart show the distribution of the pavement surface types within the collector network. As would be expected, the majority of the lane mileage is comprised of asphalt concrete pavement at 76.9%. Asphalt over portland cement concrete makes up the second largest surface type at 9.3%. This is followed by portland cement concrete at 9.0% and bituminous surface treatment at 4.8%. There are very minor amounts of both paving brick and gravel.

Pavement Type	Centerline Miles	Lane Miles	Ave. Rating Score	Percentage
Gravel	0.07	0.13	100	0.0%
Paving Brick	0.07	0.14	60	0.0%
Bituminous Surface Treat	37.45	75.27	54	4.8%
Portland Cement Conc	69.95	140.81	67	9.0%
Asphalt Over Concrete	71.01	145.93	63	9.3%
Asphalt Concrete Pavt	547.87	1,204.88	71	76.9%

Collector surface types



Collector lane mileage by surface type

THE LOCAL ACCESS NETWORK:

City Data: Of the 27 cities reporting arterial data; 16 supplied all or part of their local access information as well. The following table summaries the local access data reported by each city.

City	Centerline Miles	Lane Miles	Ave. Rating Score	Square Yards
Auburn	84.52	169.50	67	1,465,840
Bellevue	274.47	548.61	86	4,341,994
Bellingham	179.68	352.18	75	2,512,119
Friday Harbor	7.18	14.36	78	111,320
Lacey	66.32	132.51	64	857,308
Mount Vernon	69.37	138.77	76	1,191,671
Olympia	110.10	220.20	62	1,718,367
Renton	148.12	296.99	82	2,579,246
SeaTac	80.45	159.04	84	1,265,571
Seattle	1.62	3.34	87	23,100
Spokane	90.32	185.98	61	1,848,952
Spokane Valley	286.95	576.39	79	5,686,431
Tacoma	12.75	25.29	54	280,994
Tumwater	42.51	85.01	86	799,025
Vancouver	387.28	774.91	68	7,769,395
Walla Walla	128.81	257.71	67	2,376,261
Totals	**1,970.45**	**3,940.79**	**74**	**34,827,597**

Local Access data reported by each city

The data above represents 95.5% of the local access information reported by the 16 cities. The range of average rating scores within the various cities was again fairly large and ranged from a low of 54 in Tacoma to a high of 86 in Bellevue and Tumwater with the overall average slightly above the mid-point of the range at 74. As might be expected, the cities average rating scores for local access routes show more variation than the cities average scores for arterials and collectors. The correlation coefficient between the cities arterial and local access average rating scores is 0.62.

Additional local access information was reported by 5 of the 16 cities but contained no rating information and therefore was not tabulated in the table above. That unrated information is summarized in the table below.

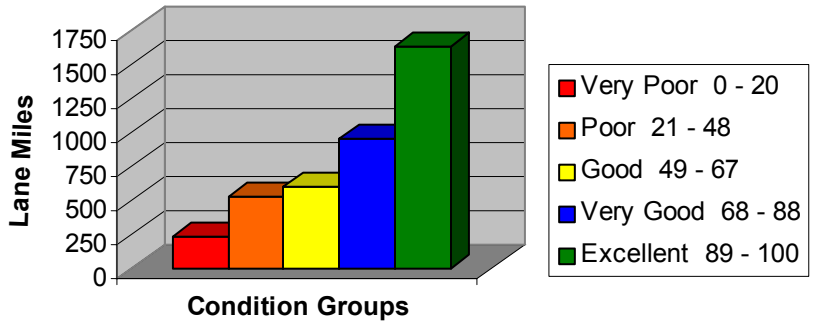
Local Access	Centerline Miles	Lane Miles	Square Yards
Non-rated Local Access	107.56	187.12	1,158,735

Condition Groups: The following pavement rating condition groups show the distribution of the local access lane mileage within the various condition groupings. The distribution shows that 19.2% of the local access lane mileage falls within the very poor to poor

category and that 65.7% of the lane mileage falls within the very good to excellent categories. The remaining 15.2% falls into the central good category. The local access distribution again shows good correlation compared with the distribution of the arterial network in condition groups. The correlation coefficient between arterial and local access condition group distribution percentages is 0.93.

Condition Group	Centerline Miles	Lane Miles	Ave. Rating Score	Percentage
Very Poor 0-20	115.45	231.39	8	5.9%
Poor 21-48	261.91	523.57	37	13.3%
Good 49-67	298.79	597.89	58	15.2%
Very Good 68-88	479.17	956.28	78	24.3%
Excellent 89-100	815.12	1,631.66	98	41.4%

Distribution of local access within the pavement condition rating groups

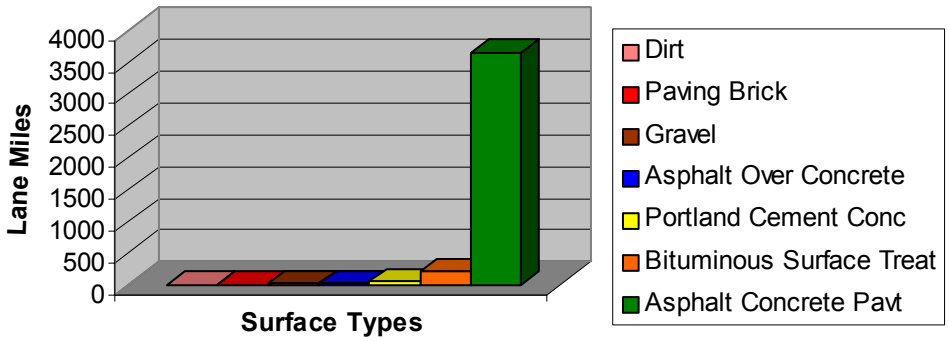


Local Access lane mileage within the condition groups

Surface Types: The following table and chart show the distribution of the pavement surface types within the local access network reported. Again, as would be expected, the overwhelming majority of the lane mileage is comprised of asphalt concrete pavement at 92.6%. Bituminous surface treatment makes up the second largest surface type at 5.4%. Portland cement concrete is the third most prevalent surface type at 1.3% and has the lowest average score at 55. This is followed by minor amounts of dirt, brick, gravel, and asphalt over concrete.

Pavement Type	Centerline Miles	Lane Miles	Ave. Rating Score	Percentage
Dirt	0.08	0.16	100	0.0%
Paving Brick	0.22	0.45	90	0.0%
Gravel	7.19	13.25	86	0.3%
Asphalt Over Concrete	9.92	19.77	58	0.5%
Portland Cement Conc	25.58	49.47	55	1.3%
Bituminous Surface Treat	105.75	210.99	61	5.4%
Asphalt Concrete Pavt	1,821.69	3,646.70	75	92.6%

Local Access surface types



Local Access lane mileage by surface type

Note: Slight variations in mileage totals are the result of rounding that occurred when compiling the various reports.